

AN ALTERNATIVE FOR ONE LUNG VENTILATION (OLV) IN AN ADULT HORSE REQUIRING THORACOTOMY

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Introduction

- ♀ Warmblood horse, 580 kg, 4y 7m old
- Surgical debridement/exploration of wound of thoracic wall at level of left shoulder (procedure 1)
- Postoperative pleural drainage system placed in standing horse; no clinical improvement but worsening of the condition (ASA IV)
- Explorative thoracoscopy & thoracotomy planned (procedure 2) with possible OLV.

Materials & methods

“Home made” endobronchial blocker (Fig 1 & 2)

- Endotracheal Tube (ETT) + Broncho Alveolar Catheter (BAL)
- Sealed to avoid leakage (tape) → no leaks

Anaesthetic protocol for procedure 2

Free access to water, no food 12 hrs before anaesthesia.

- Premedication** Romifidine ($80 \mu\text{g kg}^{-1}$) + Morphine (0.1 mg kg^{-1}) IV
- Induction** Ketamine (2.2 mg kg^{-1}) + Midazolam (0.06 mg kg^{-1}) IV
- TIVA** Right lateral recumbency
ETT up to larynx → placement of BAL into left bronchus (nasal endoscopic guidance)
ETT advanced into trachea once BAL was in place

- Maintenance** Isoflurane in O_2
- Matrix large animal unit + Smith LA 2100 ventilator
 - IPPV (10 mL kg^{-1}) + PEEP ($10 \text{ cm H}_2\text{O}$)
 - Lactated Ringer’s ($10 \text{ mL kg}^{-1} \text{ hr}^{-1}$), CRi Romifidine ($40 \mu\text{g kg}^{-1} \text{ hr}^{-1}$)

Monitoring

- ECG, pulse-oximetry, CO_2 , O_2 & isoflurane concentratrions, BP, arterial blood gases

Complications

- slight hypotension → CRi dobutamine ($0.5 \mu\text{g kg}^{-1} \text{ min}^{-1}$)
MAP>70mmHg
- ↓ PaO_2 , ↑ PaCO_2 (clinically OK)

Recovery

- Rope assisted (head collar & tail)
- O_2 supplementation (15 L min^{-1})
- Recovery score 2/5

Surgery (left approach)

- Pleuritis & communication with right half pleural cavity, fibrin & necrotic ribs removed from left hemithorax
- Flushing thoracic cavities (100 L physiological fluids)
- OLV not required → inflation of cuff of BAL & adjustment of ventilator settings would have been sufficient to allow OLV

Postoperative follow-up

- Analgesia: intercostal nerve blocks (bupivacaine), morphine (0.1 mg kg^{-1} IM, QID) , CRi lidocaine ($2 \text{ mg kg}^{-1} \text{ hr}^{-1}$, IV) & ketamine ($0.8 \text{ mg kg}^{-1} \text{ hr}^{-1}$, IV)
- After 2 hrs: signs of shock , ↑ HR, ↑RR, congestive mucosae.
- After 7 hrs COLLAPSE (lateral recumbency, dyspnoea)

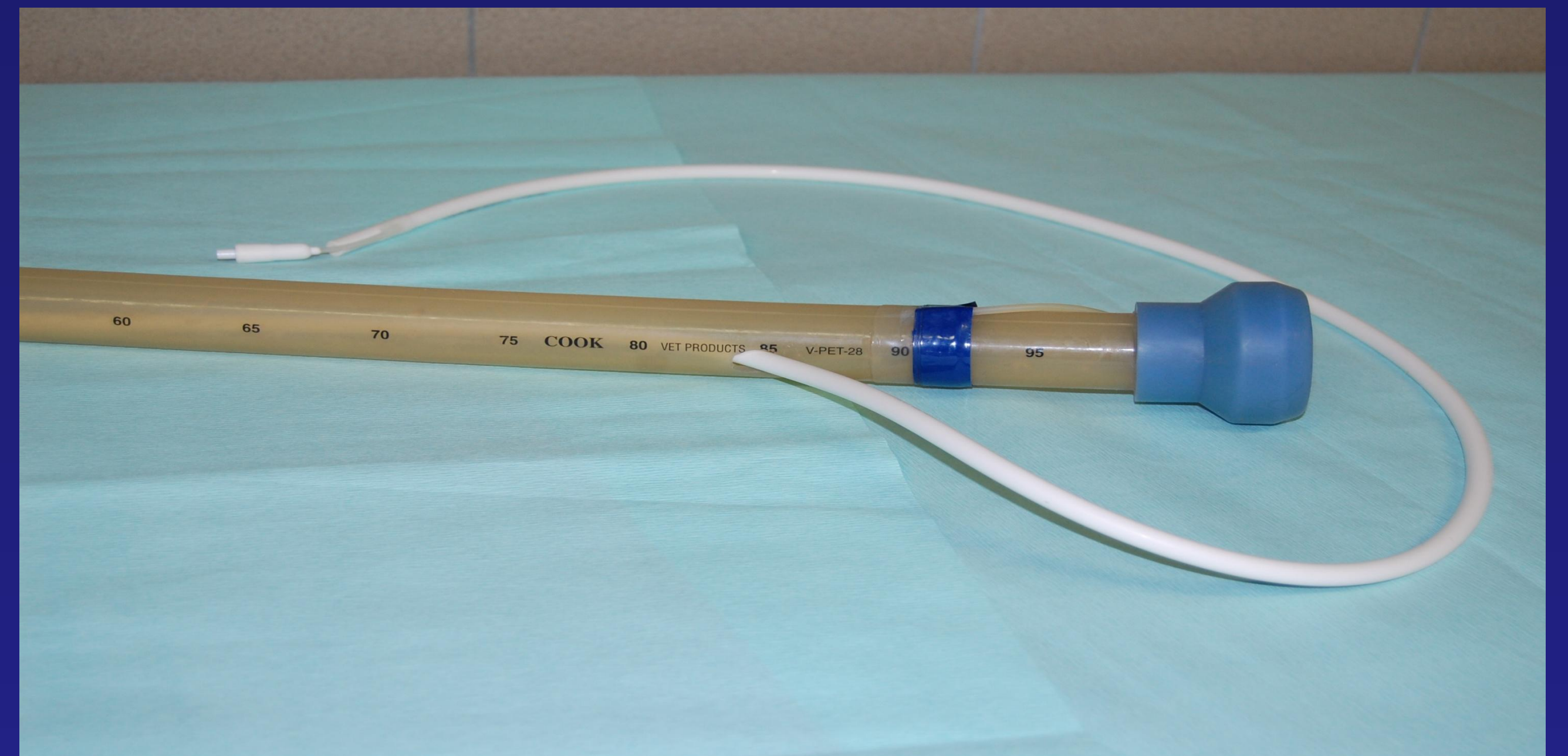


Figure 1: Proximal end of the adapted tracheal tube. An 1 cm diameter orifice was made 15 cm distally to the proximal end of a standard 28 mm ID silicone Cook tube. Using this orifice, a commercial BAL catheter with cuff was advanced inside the endotracheal tube.



Figure 2: Distal end of the adapted tracheal tube. The BAL catheter can be inflated up to a diameter of 30-35 mm if OLV is required.

Discussion

- This case report offers an easy & cheap alternative to perform OLV without a tracheostomy whereby the tube-in-tube technique¹ and the collapse of the lung on the surgical side² are combined.

- Mechanical ventilation including IPPV & PEEP is justified to prevent hypoxaemia.

- Although OLV was finally not required, inflation of the BAL cuff allows the collapse of the one lung to ameliorate the surgical intervention.

- More cases (clinical or experimental) are needed to validate this simplified technique.

Bibliography

- 1.-Moens Y, Gootjes P, Lagerweij E (1992) A tracheal tube-in-tube technique for functional separation of the lungs in the horse. *Equine Veterinary Journal* 24, 103-106.
- 2.-Inoue H, Suzuke I, Iwasake M et al. (1993) Selective exclusion of the injured lung. *J Trauma* 34, 496-498.